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09/937,230	01/24/2002	Lutz Axel May	6770-3	6567

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EXAMINER

ALLEN, ANDRE J

ART UNIT

PAPER NUMBER

2855

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/937,230

Applicant(s)

MAY, LUTZ AXEL

Examiner

Andre J. Allen

Art Unit

2855

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 23-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Acknowledgment is made of the amendment filed 1-24-02.

*Oath/Declaration*

2. Receipt is acknowledged of papers filed under 35 U.S.C. 119 (a)-(d) based on an application filed in GB on 3-23-99. Applicant has not complied with the requirements of 37 CFR 1.63(c), since the oath, declaration or application data sheet does not acknowledge the filing of any foreign application (missing acknowledgment in the yes or no boxes). A new oath, declaration or application data sheet is required in the body of which the present application should be identified by application number and filing date.

*Specification*

3. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract (150 words or less with no claim language) on a separate sheet is required.

4. A substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) because it appears that the applicant refers to claims in the specs that have been canceled or replaced.

A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37 CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

#### *Drawings*

5. Figure 1a 1b 1c 2a 2b (any figure not related to a specific aspect of the present invention) should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

#### *Claim Objections*

6. Claims 45-50 objected to because of the following informalities: It appears since claim 45 is introducing a method, this claim should be designated as an independent claim because method claims and apparatus claims' are differentiated. Appropriate correction is required.

*Claim Rejections - 35 USC § 112*

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:
- The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23-50 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claims 23-50 it is not clear how the sensor arrangements are "oriented".

With respect to claims 23-50, it is not clearly defined how annulus is magnetized such that "a closed loop of magnetic flux is established"

Regarding claims 23 and 30, the phrase "may be" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

With respect to claims 45-50, these claims are intended to be method claims but do not set forth any steps which would create a method. Appropriate correction required.

*Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garshelis in view of Opie et al and Takada. Garshelis et al teaches the basic features of the claimed invention for example:

at least one annulus of magnetised material extending about an axis, the at least one annulus being magnetised such that a closed loop of magnetic flux is established in the magnetic material, the at least one annulus being responsive to a torque applied about said axis for a torque sensor or to a bending moment acting about said axis due to an applied force for a force

sensor, as the case may be, to emanate a magnetic field component externally of said element that is a function of the applied torque or the applied force, as the case may be,

the magnetisation established in the at least one annulus provides a torque-dependent magnetic field component which has a significant non-zero value at zero torque or force and an essentially zero value at a non-zero torque or force, as the case may be.

the at least one annulus is in the form of an annular ring attachable to a shaft, and the annular ring is of a magnetoelastic material and is circumferentially magnetised.

the at least one annulus is of magnetoelastic material and is a circumferentially magnetised, integral portion of a shaft.

the at least one annulus is longitudinally magnetised in the direction of said axis.

the at least one annulus is an integral portion of a shaft.

a first annulus of magnetised material and a second annulus of magnetised material, wherein said first annulus provides an essentially zero value of magnetic field component at a non-zero torque or force of a given polarity and said second annulus provides an essentially-zero value of magnetic field component at a non-zero torque or force of the opposite polarity.

a first annulus of magnetised material and a second annulus of magnetised material, wherein said first annulus provides an essentially zero value of

magnetic field component at a non-zero torque or force of a given polarity and said second annulus provides an essentially-zero value of magnetic field component at a non-zero torque or force of the opposite polarity.

said element has a surface extending radially of said axis and comprising a first annulus of magnetisation extending to said surface and a second annulus of magnetisation extending to said surface outwardly of said first annulus, said first annulus and said second annulus being magnetised to provide a magnetic field component there between which has a significant non-zero value at zero torque or force, as the case may be, and an essentially zero value at a non-zero torque or force, as the case may be.

said first annulus is magnetized in the direction of said axis with a pole of given polarity at said surface and in which said second annulus is magnetised in the direction of said axis with a pole of opposite polarity at said surface.

said first annulus and said second annulus are each magnetised to form a respective closed loop of circumferential magnetisation, and the respective closed loops of circumferential magnetisation are of opposite polarity.

a respective further annulus of magnetisation located radially inwardly of the at least one annulus of magnetisation and longitudinally magnetised in the axial direction with a polarity opposite thereto to form a closed loop of magnetic flux therewith.

a magnetic sensor arrangement oriented to detect said magnetic field component.



a respective magnetic sensor arrangement for the at least one magnetised annulus and oriented to detect a magnetic field component in the direction of said axis.

a respective magnetic sensor arrangement for the at least one magnetised annulus and oriented to detect a magnetic field component in the circumferential (tangential) direction about said axis.

first and second magnetic sensor arrangements for detecting a respective magnetic field component emanated by said first annulus and said second annulus, each of said first and second magnetic sensor arrangements being oriented to detect a magnetic field component in the direction of said axis.

first and second magnetic sensor arrangements for detecting a respective magnetic field component emanated by said first annulus and said second annulus, each of said first and second magnetic sensor arrangements being oriented to detect a magnetic field component in the circumferential (tangential) direction about said axis.

a magnetic sensor arrangement oriented to detect said magnetic field component provided between said first annulus and said second annulus.

a magnetic sensor arrangement located to be responsive to the magnetic field between said first annulus and second annulus and oriented to detect a

magnetic field component in the circumferential (tangential) direction about said axis.

a magnetic sensor arrangement oriented to detect a radially directed magnetic field component between said first annulus and said second annulus.

second torque-dependent

signals to provide a reference signal, said output means being responsive to said reference signal to

adjust its gain in a sense acting to eliminate changes in the response relating the first and second

torque-dependent signals with torque.

the combining means is operable to effect a difference operation on said first and second torque-dependent signals.

the first channel is responsive to both of said first and second torque-dependent signals to effect a summing operation thereon.

the magnetisation of said at least one annulus is performed while the transducer element is under a

predetermined torque of one polarity about said axis.

responsive to torque applied about said axis, wherein said first and second magnetic field sensor

arrangements provide first and second torque-dependent signals respectively, and further including

signal processing means which comprises a first channel responsive to at least one of the first and

second torque-dependent signals, said first channel comprising an output means having a

controllable gain for producing an output signal representing a measure of torque, and which also

comprises a second channel comprising means for combining the first and

the magnetisation of the first annulus is performed while the transducer element is under a predetermined torque of one polarity about said axis, and the magnetisation of the second annulus is performed while the transducer element is under a predetermined torque of the opposite polarity about said axis.

the respective magnetisation of the first annulus and the second annulus are performed to provide magnetisation of opposite polarity.

the magnetisation of the first annulus and the second annulus are of the same polarity.

magnetisation of the first annulus is performed under a predetermined torque of opposite polarity to that applied in the magnetisation of the second annulus.

the magnetisation of said first annulus and said second annulus is performed while said element is under a predetermined torque about said axis. {cols. 2-30}

However Garshelis does not explicitly teach a second field sensor and a significant non zero value at zero torque and a zero value at a non zero torque.

Opie et al and Takada both teach torque sensors comprising a significant non zero value at zero torque and a zero value at a non zero torque. {Takada claim 25}{Opie et al col. 14 1-65}.

With respect to a second field sensor, since Garshelis teaches at least one field sensor 6 a second field sensor would highly suggestive to implement a second when enhancing the performance of a torque sensor.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the magnetic torque sensor taught by Garshelis with a second field sensor also provide a zero and non zero value as taught by Opie et al and Takada for the purpose of creating a torque sensor that has first and second field sensors and a zero and non zero value to optimize the performance of a magnetic torque sensor.

*Conclusion*

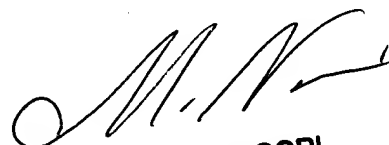
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patents 6260423, 6047605, 4907462, 5412999, 5195377 and 4896544 each disclose magnetostrictive torque sensors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre J. Allen whose telephone number is 703-3081989. The examiner can normally be reached on mon-fri 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ben Fuller can be reached on 703-308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-3432 for regular communications and 703-308-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

A.J.A  
November 1, 2002



MAX NOORI  
PRIMARY EXAMINER